News release

Rising CO_2 increases river flow by making plants less thirsty

(Issued jointly by the Met Office and Centre for Ecology and Hydrology)

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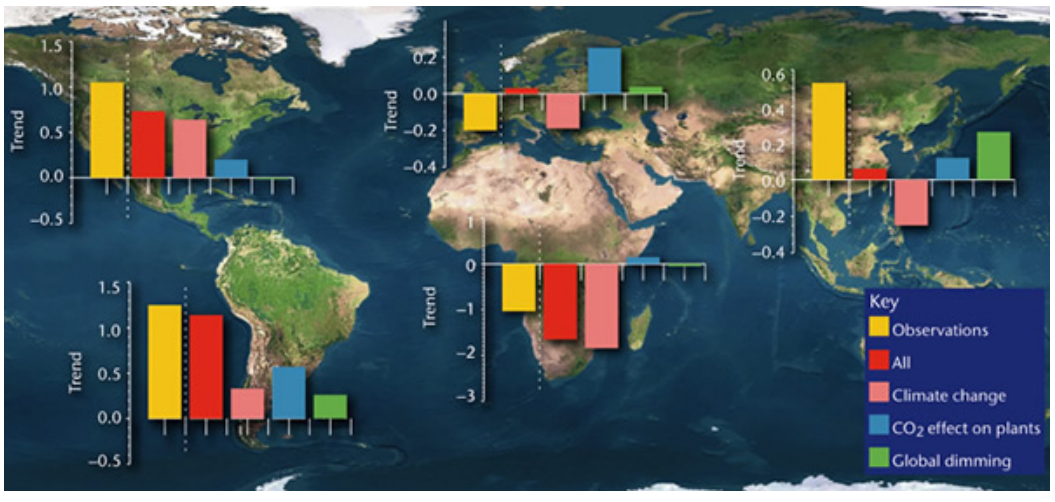
Scientists in Oxfordshire have today released new findings that could have major implications for future water resources across the planet.

Experts from the Joint Centre for Hydro-Meteorological Research (JCHMR) in Wallingford have detected the global effects of increased CO_2 on plants that have led to an increase in water running off into rivers.

The flows of many rivers around the world are increasing, even though the rainfall falling on the Earth's land mass has changed little over recent decades. In a paper published in the scientific journal *Nature*, the scientists from JCHMR present a solution to this puzzle.

Experiments have previously shown that higher carbon dioxide concentrations make plants more efficient; allowing them to extract less water from the soil, but this effect has not previously been seen at large scales. The new study indicates that the worldwide effects of plant responses to carbon dioxide are already resulting in an increase in the amount of water left to drain into the world's rivers.



Post-1960 continental averaged trends (mm/yr/yr) in observed and simulated river flow. The individual contributions from the main processes affecting the water cycle are shown (note the different scales for each continent). The impact of land use is not included because it is small. (We acknowledge David Labat (Laboratoire de Mécanismes de Transferts en Géologie, UMR CNRS, Toulouse, France) for providing the observational runoff data).

Dr Nicola Gedney, climate impacts scientist at JCHMR and lead author of the article, said: "This answers a key question about what is driving the changes in the global water cycle. CO_2 is not only a greenhouse gas, it can also affect the world's water directly through plant life."

It is widely recognised that climate change will affect the amount of fresh water available to humans, causing an increase in flooding in some regions while increasing the frequency of droughts in others. This newly detected global effect on plants will generally increase river flows as carbon dioxide levels go up, partially offsetting decreases in water availability in areas where rainfall drops, and adding to the changes where rainfall increases.

Co-author, Professor Peter Cox, Science Director Climate Change at the Centre for Ecology and Hydrology explains: "Direct effects of carbon dioxide on vegetation need to be included in assessments of how global water resources will change over the coming decades."

Notes to editors:

The Joint Centre for Hydro-Meteorological Research is a collaboration between scientists from the Centre for Ecology and Hydrology, the Met Office and the Met Office's Hadley Centre for Climate Prediction and Research.

More about the Joint Centre for Hydro-Meteorological Research

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More about the Hadley Centre

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